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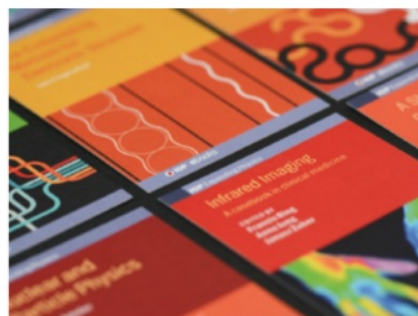
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Microsoft Visual Basic 6.0 Software to Develop Mathematics Teaching Materials

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Microsoft Visual Basic 6.0 Software to Develop Mathematics Teaching Materials

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Abstract. The presumption of mathematics lessons difficulty lead to a lack of students' learning interest, which can contribute to mathematics learning achievement. Identification of the problem in this study was carried out by conducting interviews with mathematics teachers at SMP Negeri (State middle school) 12 Bandar Lampung, Mr. I Ketut Pande, S. Pd and also giving questionnaires to the eighth-grade students of middle school about problems in mathematics. Researchers are trying to develop computerized-based teaching materials designed as attractive as possible. In supporting the development of teaching materials, researchers using an application Microsoft Visual Basic 6.0 is one of the software applications in Windows. In developing applications, Visual Basic uses a visual approach to design user interfaces of forms, while coding uses basic languages that tend to be easily understood in accordance with mathematics learning in the two-variable linear equation system material for the eighth-grade students of Middle School. This Teaching materials have validation stage by material experts, media experts and in trials on students at Bandar Lampung 12 Public Middle School. The quality of teaching materials has reached the feasibility standard of teaching materials from the results of the assessment of material experts, media experts, educational practitioners, and students. It can be concluded that mathematics teaching materials using Microsoft Visual Basic media that have been developed in this study are worthy of being used as supporting teaching materials in the teaching and learning process.

1. Introduction

Media is very helpful in the process and fluency in learning [1]. Therefore, as much as possible the teacher must be able to make media as teaching materials due to topic conformity by the student is intended so that the material to be learned by students can be accepted properly and correctly by students [2]. In mathematics learning the teacher does not only delivery of information, but also becomes a facilitator, motivator, and mentor who will provide opportunities for students to develop their thinking abilities. In addition, teachers also are able to choose and use teaching materials and appropriate learning media. The teaching materials are chosen must be objectives and fit with characteristics of students who will receive the subject. However, the phenomena are many students think that math is difficult to understand. [3]

The presumption of mathematics lessons is difficult due to a lack of student's interest, which can hamper of mathematics learning achievement. Furthermore, being difficult to think about mathematics, researchers assume, learning activities in the classroom rely solely on textbooks. This is an impact on students reluctant to learn mathematics, finally, the learning process becomes a very saturating thing.

Teaching materials or learning materials are contents of the curriculum, namely in the form of subjects or fields of study with topics or sub-topics and details [4]. states that the teacher's job is to be able to choose and develop teaching materials. Teachers can develop teaching materials about creative and

innovative especially using the development of science and technology to encouraging efforts to renewal in the utilization of technology in the learning process [5].

Teaching materials that are in accordance with the topic to be delivered are the carrying capacity to foster students' interest in learning [6]. The greater to learn mathematics, the greater student achievements in the field of mathematics. New innovations in teaching materials to be conveyed to students are the right step to foster students' interest in learning because students see more about what will be learned before exploring the material. Innovation in teaching materials carried out by educators will change the paradigm of students in mathematics lessons that seem difficult.

The results of the interview with Mr. I Ketut Pande said that, learning mathematics on the subject of the two-variable linear equation system applied in the new school uses media in the form of whiteboard and books, so that there is no computer of delivering material, in addition to making teaching materials, teacher rarely make their own teaching materials to be conveyed to students, teacher prefer to use books that have been provided by the government. The difficulty is often by students in the material system of linear equations in two variables, the inaccuracy in using calculations so that a lot of errors occur in the calculation results. Media that can help students to improve accuracy is expected. Based on the results of interviews, it is very necessary to have a teaching material in the form of media, so that the difficulties that become obstacles for students can be minimized [7]

By utilizing technological developments at this time, researchers are trying to develop computerized-based teaching materials designed as attractive as possible [8]. In supporting the development of teaching materials, researchers using an application Microsoft Visual Basic 6.0 is one of the software to build applications in the Windows. In developing applications, Visual Basic uses a visual approach to design user interfaces in the forms, while coding uses basic languages that tend to be easily understood [9-11]. With this application, it is expected to provide benefits and knowledge for students about mathematics lessons that are not monotonous because there are interfaces that are processed as attractive as possible so as to make students not easily bored and continue to be enthusiastic in learning. by creating a computer-assisted two-variable linear equation system operating program that utilizes the Microsoft Visual Basic 6.0 application program as a tool for delivering teaching material. So, this research is entitled "Microsoft Visual Basic 6.0 Software to Develop Mathematics Teaching Materials"

2. Research Method

Research Problem:

The problem statements are specified as:

1. How to develop mathematics teaching materials in the material system of two-variable linear equations using Microsoft Visual Basic 6.0 media for the eighth-grade students of middle school?
2. How do students respond to mathematics teaching materials using Microsoft Visual Basic 6.0 media that has been produced?

Operational Definition:

In order to avoid misinterpretation, it is necessary to define the terms used as follows:

1. Media is anything that can be used to channel messages from the sender to the recipient so that it can stimulate the thoughts, feelings, attention and interests and attention of students in such a way that the learning process occurs.
2. Media learning mathematics using media Microsoft Visual Basic 6.0 is a teaching material that uses computer programs. This program is a program that can produce applications with a very interesting visual display, so it is hoped that this program can help in learning, especially mathematics. The contents of this program have been designed for learning in the material system of two-variable linear equations for eighth-grade students of the middle school.
3. Mathematics teaching materials using Microsoft Visual Basic 6.0 media are good teaching materials that are tested and meet established criteria, namely: material that is developed valid and practical according to the validator and is effective that can achieve the completeness of learning outcomes and positive student responses.

4. Teaching materials are valid if the validator states that the teaching materials have good aspects, namely: a) provision of contents, b) subject matter, c) conformity with learning objectives, d) physical design.
5. Teaching materials are practical if the validator states that teaching materials are suitable to be used in the field and the reality shows that it is easy for users to use these learning tools freely.
6. Teaching materials are effective if the results of a limited trial conducted in eighth-grade students of the middle school at Bandar Lampung 12 Public Middle School show that the completeness of student learning outcomes is achieved and students' responses to the device are positive.

3

Visual Basic

Visual Basic is a computer programming language, in [12] is commands or instructions that are understood by computers to perform certain tasks. Visual Basic besides being referred to as a programming language, it is also often referred to as a tool (tool) to produce Windows-based application programs.

In Visual programming, application development starts with the formation of a user interface, then arranges the properties of the objects used in the user interface, and then the program code is written to handle events. The application development phase is known as application development with the Bottom Up approach.

Visual Basic allows the creation of Graphical User Interface (GUI) or programming applications that use the graphical display as a communication tool with the user. In Visual Basic to create a user interface display is relatively easy to do because only need to put graphics objects into the source (form) that has been provided by Visual Basic. After that, simply set the properties of these objects.

Some of the capabilities or benefits of Visual Basic include:

1. To create a Window-based application program
2. To create program help objects such as ActiveX controls, Help files, internet applications and so on.

Visual basic components are very important. These components will help us in making the program. The first time opening Visual Basic will appear several components, namely, among others, the menu bar, toolbar, form, project window, properties window, and form layout window, as shown below: [5]

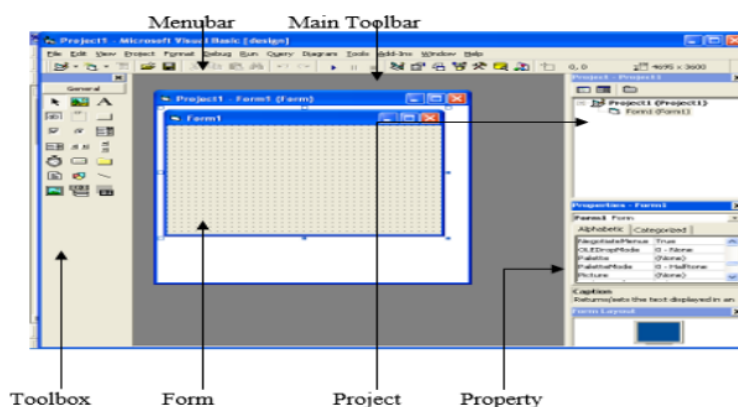


Figure 1 Example display of Microsoft Visual Basic 6.0

Information:

1. Menu Bar used to select specific tasks such as saving projects, opening projects, etc.
2. The Main Toolbar used to perform certain tasks quickly.
3. Toolbox window, this window contains components that you can use to develop the user interface.

4. ³ Form Designer window, this window is your place to design the user interface of your application. So, this window resembles a canvas for a painter.
5. ³ Object window, this window contains an overview of all modules contained in your application. You can use Ctrl + R to display the project window or use the Project Explorer icon.
6. The Properties window is a list of object properties that are currently selected. For example, you can change the foreground color and background color. You can use F4 to display the properties window.

Research methodology

Viewed from its purpose, namely to develop mathematics teaching materials using Visual Basic 06, this ⁴ research is included as part of the research and development method or what is called the R & D method (Research and Development). Research and Development is a research method used to produce certain products and test the effectiveness of these products [13].

Research sites

The location of the study was determined purposively or chosen according to the purpose and intentionally. Because the teaching material that will be produced is intended for junior high school students who are still using the 2013 curriculum in the learning process, the chosen research location is Bandar Lampung SMP 12.

Research and Development Procedure

In this study, the researcher used the development research method according to [13]. The steps of research and development are shown in the following diagram:

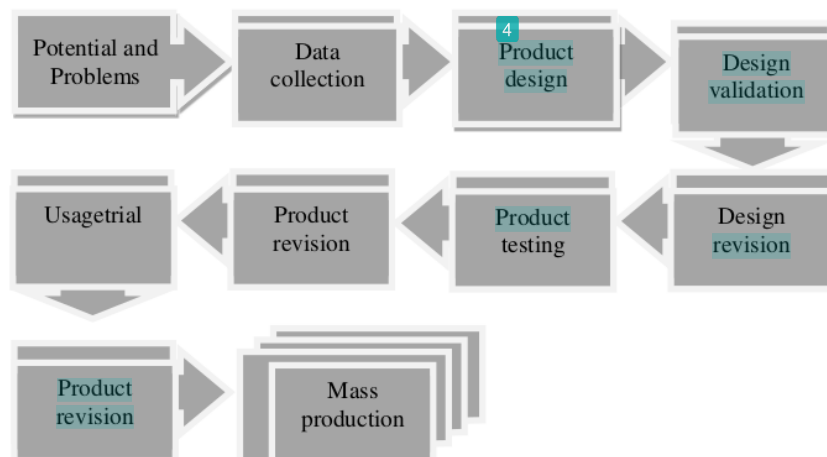


Figure 2 Steps for using Research and Development Method

Research Instrument

The development of this teaching material was carried out by the researchers themselves with guidance from the supervisor which was then validated by content experts and programming experts. To validate teaching materials, an instrument is needed in the form of an assessment sheet. [14] The assessment sheet in this research and development will be used to provide an assessment of the teaching material products that have been made. Material experts and programming experts will provide an assessment by filling in

the checklist on each item of evaluation with criteria that are feasible or not feasible. On items that are considered not feasible, experts will provide input on improvements. The assessment sheets are arranged in two types, namely:

1. Assessment sheet for material experts.
2. Assessment sheets for media experts.

The assessment sheet contains the aspects assessed as follows:

Table 1 Aspects of Assessment of Teaching Materials by Material Experts

No	Indicator	Aspects
	Quality of Content	Conformity of material. Material accuracy Curiosity
	Language	Straightforward Communicative
	Implementation	- Conformity to sample questions and material. - Presentation of material on the software display.

3. Result and Discussion

Description of Product

Based on the stages of development research which includes potential problems, data collection, product design, design validation, design improvement, product testing, and product improvement, the results of the development of mathematics teaching materials using Microsoft Visual Basic 6.0 are obtained:

1. Potential and Problems

Identification of the problem in this study was carried out by interviewing eighth-grade mathematics teachers at Public Middle School 12 Bandar Lampung, Mr. I Ketut Pande, S.Pd and also giving questionnaires to the eighth-grade students about problems in the class and school.

The following is one of researcher's question: "To deliver the material, what teaching materials do you usually use in mathematics learning?" Respondent's answer: "Usually I use printed books provided by the government and some books published by publishers." Based on the interview, the potential for product development aims to minimize the problems in the classroom that in the school mathematics learning is still focused on printed books while with the development of an all-technology era, books are no longer luxurious items, especially for complicated math subjects. Therefore, there is a need for innovation to advance the quality of education by developing a technology-based teaching material.

From the results of interviews, questionnaires, and observations that have been conducted by the researcher, the fundamental problems that occur in the eighth-grade students of middle schools, such as the missing of mathematics teaching materials that use Microsoft visual basic, especially in the two-variable linear equation system material. Existing problems provide ideas to researchers to develop mathematics learning teaching materials that are developed by fulfilling the principles of teaching materials basically so that teaching materials have the appropriate standards of teaching materials. This teaching material was developed in a linear two-variable system of material equations which later will be in the form of software.

2. Product Design

This stage is the stage where all the teaching material objects are made. Development of teaching materials begins with the creation of display forms, then from the display forms the initial display form, usage guide form, understanding form, sample form, training form, answer test form, and evaluation form.

Thus, the researcher can describe the content in the teaching material if it has been separated in each part, this will facilitate the preparation of teaching materials to be developed as follows.

2.1 Initial display

Figure 3.1 is the initial display when the program is opened. The initial display contains the identity of the teaching material in the form of the title of the teaching material, the title of the material and the class, besides that there is a menu that can be clicked on by the user to start learning. If the user clicks on the "Start" button, the user will see the guide display using the selection button in the teaching material.



Figure 3.1 Initial View of the Program

2.2 Display Button Usage Guide

This display contains the usefulness of several menu buttons that will be found in each form, so that before the user continues on the forms then they can find out the function on the menu button that is available as shown below.



Figure 3.2 Display of the Button Usage Guide

2.3 Concept Map Display

This figure contains a concept map of the material to be studied, this aims so that before starting the learning the user knows the sub-material and the parts to be studied during mathematics learning in the material system of linear variables two variables.



Figure 3.3 Concept Map View.

2.4 Display of SK and KD

This view contains the standards of competence and basic competencies of the material to be studied, this is intended so that users can find out the competency standards achieved and the basic competencies of the teaching material. This display will appear after pressing the SK / KD menu button as shown below.

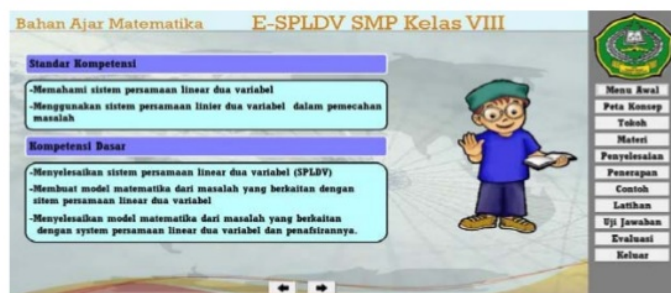


Figure 3.4 Display of Standard of Competency

2.5 Display of Mathematical Scientist Figures

This view contains the figures of Islamic mathematical scientists who are famous for their discoveries. It aims to motivate students to discover the mathematical concepts found by Muslims. This display will appear after pressing the figure button as shown below.

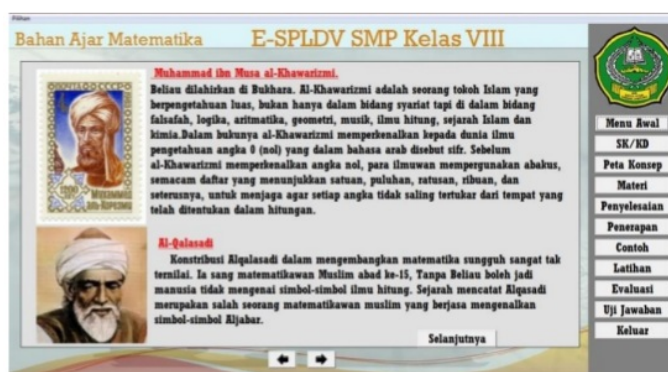


Figure 3.5 Display of Mathematical Scientist

2.6 Definition of Systems of linear variables are two variables

This menu contains an explanation of the meaning of two variables linear equations. On this form, there is a selection button for the Ar-Rahman study, which contains the relationship of material to a system of linear two-variable equations with Ar-Rahman verse 33. In addition, there are other selection buttons that can be used to study other study material. Images can be seen as below.

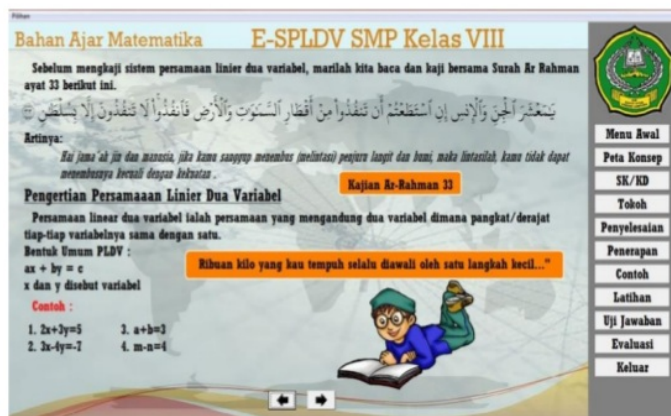


Figure 3.6 Display Definition of Two-Variable Linear Equations

2.7 Exercise Menu

On this form, the questions from the system material are linear variables of two variables. This training form aims to test the user to find out the understanding of the material because on this form it can correct answers that are chosen correctly and quickly and have an interesting voice if the choice is correct or wrong as shown below.

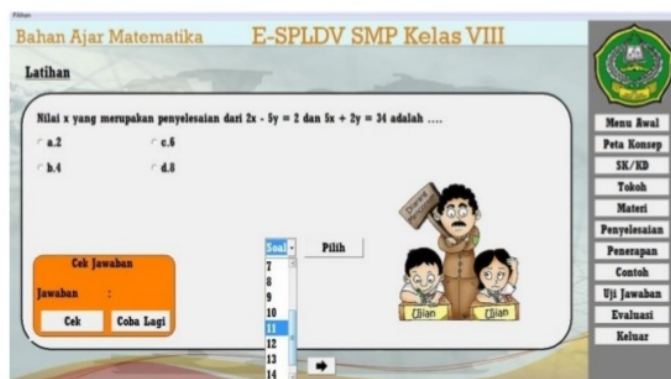


Figure 3.7 Display Problem Questions

2.8 Test Menu Answer

This menu contains programs to test the questions that have been done by the user, it aims to find out the answers to the questions that have been done. this form makes it easy for users to learn on their own because the program will correctly provide the user's answers either right or wrong as the results of the work will be visible.

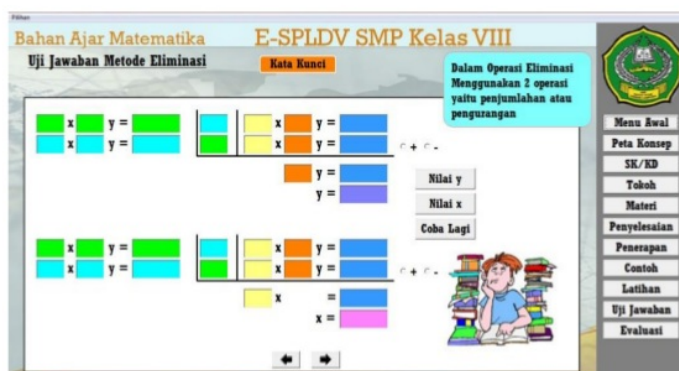


Figure 3.8 Display Elimination Method Answer Test

2.9 Evaluation Menu

The evaluation menu contains varied questions, as well as evaluations in the textbook but there is a scoring feature that works after completing 20 multiple-choice questions and 5 essays with 50 minutes. Thus, the user can see his ability to what extent to the mathematics subjects in the material system of linear variables two variables.



Figure 3.9 Display of the Evaluation Form

Making the Design of the Product

The making of the initial design of teaching materials is adjusted to the forms that have been designed by the developer and assisted by a guide who gives direction and input. The following are the general stages in making mathematics teaching materials in a two-variable linear equation system material using Microsoft Visual Basic media:

1. Prepare pictures, sample questions, questions, etc. that will be included in the teaching material that will be made.
2. Making previously designed forms. The following will explain the general description of making teaching materials:
 - 2.1 Open Microsoft Visual Basic, where the developer uses Microsoft Visual Basic 6.0 in developing teaching materials in the form of software.
 - 2.2 Select "Standard EXE" then click open.



Figure 3.10 Initial View of Microsoft Visual Basic 6.0

2.3 After opening, changing the caption becomes the Initial Form. This is done to make it easier to remember the form name as the main display form.

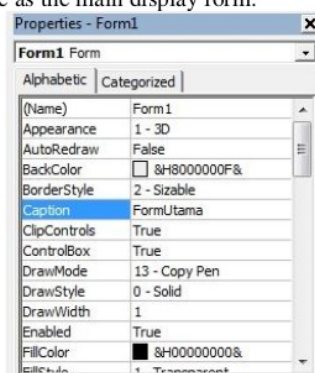


Figure 3.11 Display Menu Properties To Change Caption On Form

3. After changing, select Picture in the properties menu. Select and click "Open" in the image file that will be used as the background for displaying the teaching material.

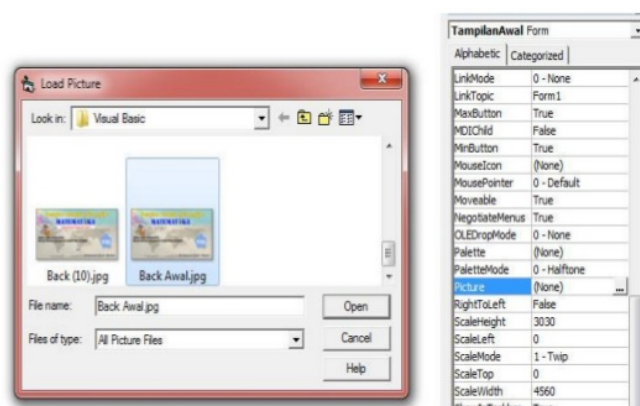


Figure 3.12 Display Entering Images to Be Backgrounded

4. After being selected, the background display will change according to the image we have chosen to be the background of the software we will create.



Figure 3.13 Display Microsoft Visual Basic After Input Background Image.

5. After the image is replaced, click Command Button to make the button click "Start". Change the caption to the word "Start" to change the word Command1.



Figure 3.14 Display Command1 that has been changed to "Start".

6. After making the button click "Start", the next step adds the second form to the concept map display. How to select and click the Project menu, select Add Form, select Form and click Open. Every time we want to make a new look, we have to make a new form like now.



Figure 3.15 Display How to Add a New Form

7. After adding a new form, it will appear like the previous form with a plain background. To change the background can be done in the same way as the treatment in the previous form.

8. To connect the main form to the concept map form, we must return to the main form. Double-click on the command button that was created earlier. Enter `form2.show` and `form1.hide`. This means that when "Start" is clicked, then form1 (Initial Form) will disappear and form2 (Guide Form) will appear.

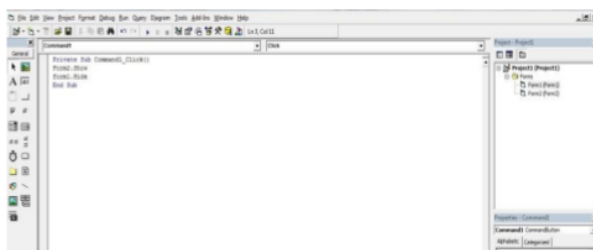


Figure 3.16 Coding Display in Microsoft Visual Basic 6.0

9. To test whether the coding is correct or not, click the Run menu and select and click Start.

Description of design Validation by Experts

Design validation is done by presenting several experts or experienced experts to assess the teaching materials that have been made by the researcher. Aspects assessed by material experts are aspects of content, language, and implementation. The validator assess on aspects of content quality obtained results with a percentage of 80%, in the language aspect the evaluation of the validator obtained results with a percentage of 75%, and for the aspects of the implementation of the validator's assessment, the results were obtained at 80%. Although it has entered the good criteria for validated teaching materials, there is still a need for revisions to the validated teaching material. After the revision of teaching materials, the second stage of validation was carried out by researchers to see the quality of the revised teaching materials. The aspects assessed in this validation remain like the first stage of validation, from the results of the second validation the following results are obtained.

Trial Analysis of Usage by Students and Educational Practitioners

The trial of product use is carried out on eighth-grade students of the middle school. This stage is carried out to determine the effectiveness of the product being developed and obtain input to make the final product revision. At this stage the researcher distributes questionnaires to 44 students, this aims to determine the effectiveness of teaching materials in the eyes of students.

1. Analysis of Response of Students

Assessment of teaching materials by students is done by asking students to fill out the questionnaire that has been given by the researcher. This stage is carried out to determine the effectiveness of the product being developed and obtain input to make the final product revision. The results of the testing of teaching materials in students were conducted with four aspects of assessment, namely aspects of display software, language, usage, and material. The display aspect of software was obtained by the percentage of 86% with very good criteria, language aspects obtained by the percentage of 82% with very good criteria, aspects of use obtained 85% percentage results with very good criteria, and material aspects obtained 84% with very good criteria. The overall percentage of teaching materials that have been developed is 84%. The results of the percentage of overall teaching materials indicate the quality of teaching materials that have been developed.

The conclusion is that the teaching materials that have been developed according to the response are included in very good criteria for use in mathematics learning. Some students who took part in the trial of teaching materials gave input and suggestions about teaching materials that had been developed, the input and suggestions obtained would be used as a reference for researchers to make improvements to the

teaching materials that had been developed. The next revision stage is the developer needs to improve the teaching material that has been developed.

2. Educational Practitioner Assessment Analysis

Educational practitioner assessment is carried out by giving the assessment sheet to the teacher of mathematics learning, in this assessment the researcher used 2 teachers as the instructor material evaluators that had been developed. Aspects assessed by education practitioners are aspects of content, language, and implementation. [15-16]. Educational practitioners' assessment of the content aspect obtained results with a percentage of 92%, in the language aspect the educational practitioners' assessment obtained results with a percentage of 95%, and for the implementation aspects of the assessment of education, practitioners obtained results with a percentage of 92%. Evaluation of the feasibility of teaching materials that have been developed is obtained overall results with a percentage of 93% with very good criteria. the results of this educational practitioner's assessment show the quality of teaching materials that have been developed by researchers in the form of learning Software.

Final Product Study

After analyzing the assessment of teaching materials by experts and students [11], it can be seen the feasibility level of teaching materials based on all the respondents. Based on the results of the material expert's assessment [11], the teaching material is included in the criteria very well, with a feasibility rate of 87%. Based on the results of the media expert's assessment, the teaching material is included in the criteria very well, with a feasibility rate of 89%. Based on the results of trials on students, this teaching material is included in the criteria very well, with an eligibility rate of 84%. Based on the assessment of education practitioners, this teaching material is included in the criteria very well, with a feasibility rate of 93%.

When compared with the relevant research found in chapter 2, the research conducted by Aditya Wahyu Kristianto et al. Obtained the results that the results of the validation of teaching materials using visual basic obtained data that the average results of teaching materials design were very good with a percentage score of 80.00 %, the content aspect is very good with a percentage score of 76.00%, the Communication aspect is very good with a percentage score of 90.00%, the conformity aspect is very good with a percentage score of 90.00%, while the score for aspects Interactivity gets 90.00% which is very good value. Judging from the average score given validation shows a score of 83.75%. Based on the level of validation category, this assessment score can be interpreted that the teaching material has very good and good quality used, and the research conducted by Saputro Aji obtained validity results of the very valid RPP (4.10) and the validity of highly valid categorized visual basic learning media (4), the response of students is categorized as positive (70% or more students respond in positive categories), and student learning outcomes meet the individual and classical completeness limits (81.8%), so the mathematics teaching materials using visual basic developed by researchers are said to have high quality very good and interesting to use as mathematics teaching materials. This is in accordance with the two relevant studies, which together develop teaching materials using visual basic, and obtain research results that are not much different so it can be concluded that the final results of the development of teaching materials are suitable to be used as mathematics teaching materials in linear equation system material two variables. The final product of this teaching material is a product that has passed the first and second revision stages. This teaching material is in the form of software that can run on Windows XP, Seven, 77 and Windows 8.

Research Limitations

Research Limitations as follows:

1. The stage of developing teaching materials using Microsoft Visual Basic media only until revision II and did not carry out mass production due to limited costs.
2. Determination of quality standards of teaching materials in this study is limited to the assessment by 2 material experts, 2 media experts and programming, the quality of teaching materials can change if tested on a broader scale.

3. The media can only be used on PCs or laptops that have OS Windows XP, Seven or Windows Eight, so there needs to be more development in order to run on other Oses or on Smartphones.

4. Conclusion

Based on the description in the previous chapter, conclusions can be taken as follows:

The development of mathematics teaching materials in the material system of two-variable linear equations using Microsoft Visual Basic media was developed by taking into account Standard of Competence due to mathematics learning in the two-variable linear equation system material for eighth-grade students of the middle school. Teaching materials developed have gone through the validation stage by material experts, media experts and in trials on students at Public Middle School 12 Bandar Lampung. The quality of teaching materials has reached the feasibility standard of teaching materials from the results of the assessment of material experts, media experts, educational practitioners, and students.

5. Suggestion

Suggestions that can be conveyed based on the results of research on the development of mathematics teaching materials in the material system of two-variable linear equations using Microsoft Visual Basic media are as follows:

1. Mathematics teaching materials developed can be used by teachers as a source of learning in mathematics learning in junior high school.
2. Teaching materials need to be upgraded to e-learning so that it is easier for users to access it.
3. Mathematics teaching materials can be used by junior high school students as one of the independent teaching materials
4. Schools used for research should schools that have complete and adequate computer laboratory facilities so that learning can be carried out optimally.
5. The new development using Microsoft Visual Basic software version 6.0, so there needs to be developed for the latest version so that the display is more attractive, and its features are more up to date.

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